

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended) An electronic circuit for a contactless tag, comprising:
~~a transceiving device having an antenna coil; and~~
~~means for switching between a state where the antenna coil forms a resonance circuit of the transceiving device and a state where the antenna coil forms a booster circuit,~~
~~wherein the means for switching includes a changeover switch having a first connection terminal for connection of the transceiving device to the resonance circuit and a second connection terminal for connection of the transceiving device to the booster circuit~~
a changeover switch having a first connection terminal, a second connection terminal and a contact that is coupled to the antenna coil;
a rectification circuit that rectifies an electromotive force induced by the antenna coil due to electromagnetic induction to generate a rectified voltage, the rectification circuit being coupled to the first connection terminal;
a resonance circuit including the antenna coil and the rectification circuit being formed during a first period in which the contact connects to the first connection terminal through the changeover switch, and
a booster circuit having a function of a charge pump including a transistor and the antenna coil being formed during a second period in which the contact connects to the second connection terminal through the changeover switch.
2. (Currently amended) The electronic circuit for a contactless tag according to claim 1 3, wherein the ~~means for switching switches between the two states based on an electromotive force induced by the antenna coil due to electromagnetic induction~~ contact is connected to one of the first connection terminal and the second connection terminal based on the circuit changeover control signal.

3. (Currently amended) The electronic circuit for a contactless tag according to claim 1, wherein the first connection terminal for the resonance circuit and the second connection terminal for the booster circuit are sequentially connected to the antenna coil according to a circuit changeover control signal, and the electronic circuit further comprises:

~~means for rectifying the electromotive force via the first connection terminal to generate a rectified voltage;~~

~~first and second capacitors connected in parallel to the means for rectifying for storing the rectified voltage;~~

further comprising:

a first capacitor connected in parallel to the rectification circuit that stores the rectified voltage;

a second capacitor connected in parallel to the rectification circuit that stores the rectified voltage;

a battery connected coupled to the second connection terminal; and

a control circuit means for generating a the circuit changeover control signal and a switching driving signal based on the rectified voltage; and

~~a charge pump that is turned on and off according to the switching driving signal when the booster circuit is formed according to the circuit changeover control signal, and that causes a first current that is conducted through the antenna coil from the battery to flow so as to store a charge in the antenna coil during an ON time, while supplying a boosted voltage based on a counter electromotive force generated in the antenna coil to the second capacitor so as to cause a second current to flow to the second capacitor from the antenna coil during an OFF time,~~

the transistor being controlled according to the switching driving signal during the second period.

a first current path in the booster circuit being formed during a third period in which the transistor is in an ON state.

a second current path in the booster circuit being formed during a fourth period in which the transistor is in an OFF state,

the first current path including the battery, the antenna coil and the transistor;

the second current path including the antenna coil and the second capacitor, a first current flowing through the first current path during the third period, and

a second current based on a counter electromotive force generated in the antenna coil flowing through the second current path during the fourth period.

4. (Currently amended) The electronic circuit for a contactless tag according to claim 1, ~~wherein the first connection terminal for the resonance circuit and the second connection terminal for the booster circuit are sequentially connected to the antenna coil according to a circuit changeover control signal, and the electronic circuit further comprises:~~

~~means for rectifying the electromotive force via the first connection terminal to generate a rectified voltage;~~

~~first and second capacitors connected in parallel to the means for rectifying for storing the rectified voltage;~~

a first capacitor connected in parallel to the rectification circuit that stores the rectified voltage;

a second capacitor connected in parallel to the rectification circuit that stores the rectified voltage;

a battery coupled connected in parallel to the means for rectifying rectification circuit; and

a control circuit means for generating the circuit changeover control signal and a switching driving signal based on the rectified voltage; and

a charge pump that is turned on and off according to the switching driving signal when the booster circuit is formed according to the circuit changeover control signal, and that causes a first current that is conducted through the antenna coil

~~from the battery to flow so as to store a charge in the antenna coil during an ON time, while supplying a boosted voltage based on a counter electromotive force generated in the antenna coil to the second capacitor so as to cause a second current to flow to the second capacitor from the antenna coil during an OFF time,~~

the transistor being controlled according to the switching driving signal during the second period,

a first current path in the booster circuit being formed during a third period in which the transistor is in an ON state,

a second current path in the booster circuit being formed during a fourth period in which the transistor is in an OFF state,

the first current path including the battery, the antenna coil and the transistor;

the second current path including the antenna coil and the second capacitor, a first current flowing through the first current path during the third period, and

a second current based on a counter electromotive force generated in the antenna coil flowing through the second current path during the fourth period.

5. (Currently amended) The electronic circuit for a contactless tag according to claim 3, further comprising: ~~a means for detecting the rectified voltage, wherein the battery is connected to the second connection terminal via the means for generating according to the detected rectified voltage~~

a rectified-voltage detection circuit that detects the rectified voltage, the battery is connected to the second connection terminal via the control circuit according to the detected rectified voltage.

6. (Currently amended) The electronic circuit for a contactless tag according to claim 4, ~~wherein the battery is chargeable, and the electronic circuit further comprises a means for detecting a voltage of the battery, wherein the circuit changeover control signal is generated based on the detected voltage of the battery~~ further comprising:

a battery-voltage detection circuit that detects a voltage of the battery,
the battery is chargeable and the circuit changeover control signal and the
switching driving signal based on the detected voltage of the battery.

7. (Currently amended) The electronic circuit for a contactless tag according to claim 6, wherein the ~~means for generating~~ comprises:

~~an antenna changeover circuit that generates the circuit changeover control signal based on the rectified voltage or the voltage of the battery; and~~

~~a field effect transistor (FET) control circuit that generates a switching gate signal having a duty ratio corresponding to a predetermined ratio of an ON-OFF operation according to the circuit changeover control signal~~

control circuit comprises an antenna changeover circuit that generates the circuit changeover control signal based on the detected voltage of the battery and a transistor control circuit that generates the switching driving signal having a duty ratio corresponding to a predetermined ratio of an ON-OFF operation according to the circuit changeover control signal.

8. (Original) A contactless tag using the electronic circuit for a contactless tag according to claim 1.

9. (Canceled)

10. (Currently amended) The electronic circuit for a contactless tag according to claim 9 1, wherein the antenna coil resonates according to a power supplied from the a reader/writer when it is brought into close proximity to the reader/writer.

11-12. (Canceled)

13. (Currently amended) The An electronic circuit for a contactless tag ~~according to claim 11 comprising:~~

a transceiving device having an antenna coil; and

a circuit changeover switch that switching between a state where the
antenna coil forms a resonance circuit of the transceiving device and a state where
the antenna coil forms a booster circuit,

wherein the circuit changeover switch includes a first connection terminal for connection of the transceiving device to the resonance circuit and a second connection terminal for connection of the transceiving device to the booster circuit,

wherein the first connection terminal for the resonance circuit and the second connection terminal for the booster circuit are sequentially connected to the antenna coil according to a circuit changeover control signal, and the electronic circuit further comprises:

a rectification circuit that rectifies the electromotive force via the first connection terminal to generate a rectified voltage;

first and second capacitors connected in parallel to the rectification circuit for storing the rectified voltage;

a battery connected to the second connection terminal;

a control circuit that generates the circuit changeover control signal and a switching driving signal based on the rectified voltage; and

a charge pump that is turned on and off according to the switching driving signal when the booster circuit is formed according to the circuit changeover control signal, and that causes a first current that is conducted through the antenna coil from the battery to flow so as to store a charge in the antenna coil during an ON time, while supplying a boosted voltage based on a counter electromotive force generated in the antenna coil to the second capacitor so as to cause a second current to flow to the second capacitor from the antenna coil during an OFF time.

14. (Currently amended) The An electronic circuit for a contactless tag according to claim 11 comprising:

a transceiving device having an antenna coil; and

a circuit changeover switch that switching between a state where the antenna coil forms a resonance circuit of the transceiving device and a state where the antenna coil forms a booster circuit,

wherein the circuit changeover switch includes a first connection terminal for connection of the transceiving device to the resonance circuit and a second connection terminal for connection of the transceiving device to the booster circuit,

wherein the first connection terminal for the resonance circuit and the second connection terminal for the booster circuit are sequentially connected to the antenna coil according to a circuit changeover control signal, and

the electronic circuit further comprises:

a rectification circuit that rectifies the electromotive force via the first connection terminal to generate a rectified voltage;

first and second capacitors connected in parallel to the rectification circuit for storing the rectified voltage;

a battery connected in parallel to the rectification circuit;

a control circuit that generates the circuit changeover control signal and a switching driving signal based on the rectified voltage; and

a charge pump that is turned on and off according to the switching driving signal when the booster circuit is formed according to the circuit changeover control signal, and that causes a first current that is conducted through the antenna coil from the battery to flow so as to store a charge in the antenna coil during an ON time, while supplying a boosted voltage based on a counter electromotive force generated in the antenna coil to the second capacitor so as to cause a second current to flow to the second capacitor from the antenna coil during an OFF time.

15. (Original) The electronic circuit for a contactless tag according to claim 13, further comprising a detector that detects the rectified voltage, wherein the battery is connected to the second connection terminal via the control circuit according to the detected rectified voltage.

16. (Original) The electronic circuit for a contactless tag according to claim 14, wherein the battery is chargeable, and the electronic circuit further comprises a detector that detects a voltage of the battery, wherein the circuit changeover control signal is generated based on the detected voltage of the battery.

17. (Original) The electronic circuit for a contactless tag according to claim 16, wherein the control circuit comprises:

an antenna changeover circuit that generates the circuit changeover control signal based on the rectified voltage or the voltage of the battery; and

a field-effect transistor (FET) control circuit that generates a switching gate signal having a duty ratio corresponding to a predetermined ratio of an ON-OFF operation according to the circuit changeover control signal.

18. (Currently amended) The electronic circuit for a contactless tag according to claim 11 13, wherein the transceiving device is brought into close proximity to a reader/writer for data communication.

19. (Original) The electronic circuit for a contactless tag according to claim 18, wherein the antenna coil resonates according to a power supplied from the reader/writer when it is brought into close proximity to the reader/writer.

20. (Canceled)

21. (New) The electronic circuit according to claim 5, the control circuit having an antenna changeover circuit that generates the circuit changeover control signal based on the detected rectified voltage and a transistor control circuit that generates the switching driving signal having a duty ratio corresponding to a predetermined ratio of an ON-OFF operation according to the circuit changeover control signal.